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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Gesine Arends

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7590 06/14/2007
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EXAMINER

LEUNG, JENNIFER A

ART UNIT

PAPER NUMBER

1764

MAIL DATE

DELIVERY MODE

06/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/612,798

Applicant(s)

ARENDS ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2006 and 26 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments submitted on December 21, 2006 and March 26, 2007 have been received and carefully considered. The changes made to the drawing are acceptable. Claims 1-11 are under consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura (JP 62-74448).

Regarding claim 1, Kitamura (FIGs. 1-4; Abstract) discloses an apparatus comprising:
a heating apparatus (i.e., burner 4) for production of a heating stream, wherein the heating stream is separated into two flue gas partial flows (i.e., at conduit 12, the heating stream is divided between conduit 25 and the innermost layer of heat exchanger 24);

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a first converter (i.e., the middle layer of heat exchanger **24**, in communication with conduit **13**) and a second converter (i.e., the reformer pipe **9**) arranged behind the first converter in a flow direction of matter (i.e., as defined by the supply of reactants via conduits **17,18** to the discharge of generated hydrogen gas via conduit **16**);

a first heating element flowed-through by the heating stream (i.e., the heating chamber **8** defined by shell **1**) for heating the second converter **9**, wherein in at least one operating phase, the heating stream **8** for the second converter **9** flows completely counterflow to the flow of educt matter (i.e., the heating stream flows downward in chamber **8** whereas the matter may flow upwards in reformer tube **9**; see FIG. 1, 2);

a second heating element (i.e., the innermost layer of heat exchanger **24**, in communication with conduit **12**) flowed-through by the heating stream for heating the first converter (i.e., for heating the middle layer of exchanger **24**); and

an outlet opening (i.e., to conduit **26**) provided on the second heating element, wherein the second heating element is provided with a control valve **28** for closing the outlet opening.

Kitamura, however, is silent as to the control valve **28** comprising a “flap” valve. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select/substitute a “flap” valve for the control valve **28** in the apparatus of Kitamura, on the basis of suitability for the intended use, because the Examiner takes Official Notice that “flap” valves are well known in the art as flow regulating structures, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Regarding claim 2, in at least one operating phase, the heating stream for the first converter flows completely in a counterflow direction to the flow of matter (see FIG. 4, wherein the heating stream flows upwards via conduit **12**, and the matter flows downward via conduit **13**). Also, in at least one operating phase, the heating stream for the second converter flows completely in a counterflow direction to the flow of matter (i.e., the heating stream flows downward in chamber **8**, whereas the matter may flow upwards in reformer **9**; see FIG. 1, 2).

Regarding claim 3, the apparatus of Kitamura structurally meets the claims because the second heating element (i.e., the innermost layer of heat exchanger **24**) is provided for heating the first converter (i.e., the middle layer of heat exchanger **24**), and the recitation of a desired operating period for the heating element (i.e., during a start phase) adds no further patentable weight to the claim.

Regarding claim 4, the second heating element (i.e., the innermost layer of heat exchanger **24**) is disposed between the first converter (i.e., the middle layer of heat exchanger **24**) and the second converter (i.e., reformer tube **9**). (see FIG. 2, 3).

Regarding claims 5 and 6, an inlet opening and/or an outlet opening of the first and/or second heating element is provided with the control valve **27** for apportioning the heating stream, wherein a control unit **30** is provided for controlling the control valve **27**.

Regarding claim 7, the first converter (i.e. the middle layer of heat exchanger **24**) and the second converter (i.e., reformer tube **9**) are arranged approximately coaxially to one another (see FIGs. 3). Also, the first heating element (i.e., the heating chamber **8**) and the second heating element (i.e., the innermost layer of heat exchanger **24**) are arranged approximately coaxially to one another (see FIGs. 2, 3). Also, the first converter, second converter, first heating element

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and second heating element are arranged approximately coaxially to one another (see FIGs. 2-4).

Regarding claims 8 and 9, the heating apparatus (i.e., burner 4) is arranged approximately coaxially and centrally to the converters and/or the heating elements (see FIGs. 1-3).

Regarding claim 10, the same comments with respect to Kitamura apply (see claim 1 above). Furthermore, Kitamura discloses that the apparatus for converting a hydrocarbon containing flow of mater to a hydrogen-enriched fluid flow is part of a fuel cell assembly, wherein the fuel cell assembly comprises a fuel cell unit (i.e., at a point downstream from element 21; see Abstract).

Regarding claim 11, the same comments with respect to Kitamura apply (see claims 1 and 10 above). Although a motor vehicle is not described in the Abstract or shown in the figures, it would have been obvious for one of ordinary skill in the art at the time the invention was made to use the fuel cell assembly of Kitamura in a motor vehicle, on the basis of suitability for the intended use, because the Examiner takes Official Notice that the use of fuel cells for powering motor vehicles is conventionally known in the art.

Response to Arguments

3. Applicant's arguments filed December 21, 2006 have been fully considered but they are not persuasive. Applicant (beginning at the last paragraph on page 8) argues that,

“... Kitamura does not disclose any first converter. The middle layer of the heat exchanger 24 is provided only to raise the temperature of a gaseous mixture consisting of stock gas and steam. There is no indication that a conversion of this gas mixture happens. A conversion of this gaseous mixture takes place in a reforming pipe 9 containing a packed catalyst bed only. The Applicants submit further that the Examiner must show that the inner heat exchanger layer 24 acts as a converter. Since this is not the case, the claims are not unpatentable under Section 103.”

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The Examiner respectfully disagrees. Claim 1 (lines 6-8) currently recites, “a first converter (2) and a second converter (3) arranged behind said first converter in a flow direction to a hydrogen-rich fluid flow (10), wherein the flow of matter (4) is converted in the first converter and second converter.” The apparatus of Kitamura meets this limitation, since the middle layer of the heat exchanger is *structurally capable* of converting a flow of matter, e.g., by converting a liquid containing feed material into a gaseous feed material, by heating the liquid to a temperature above its vaporization point. The claim does not define a particular form of “converting” that is to occur in each of the first and second converters. Also, the claim does not require that the “converting” comprise a chemical reaction. It is noted that the features upon which Applicant relies (for example, a first converter and a second converter each containing catalysts) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant (second paragraph on page 9) further argues,

“...in the present amendment, claim 1 has been amended to define “a second heating element (9) that is flowed-through by the heating stream for heating the first and second converter” (rather, than “first *or* second converter). The Kitamura reference shows two heating elements, one of them heating the reforming pipe 9, the second for heating layers of the heat exchanger 24 only. Kitamura does not disclose any heating element heating the reforming pipe 9 as well as the layers of the heat exchanger 24. Therefore, amended claim 1 should be allowable on this basis over Kitamura.”

The Examiner respectfully disagrees. It is noted that Applicant’s argument is not commensurate with the instant language of the claim. Claim 1 (lines 13-14) currently recites, “a second heating element (9) that is flowed-through by the heating stream for heating at least one of the first and

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second converters.” Thus, a second heating element that only heats the first converter (or only heats the second converter) will still meet the claim.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Jennifer A. Leung
June 1, 2007


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